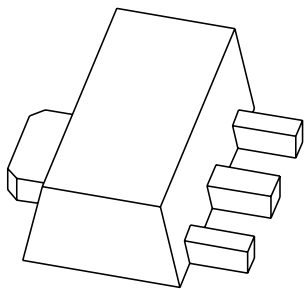


DATA SHEET



BST50; BST51; BST52 NPN Darlington transistors

Product specification
Supersedes data of 2001 Feb 20

2004 Dec 09

NPN Darlingtons transistors

BST50; BST51; BST52

FEATURES

- High current (max. 0.5 A)
- Low voltage (max. 80 V)
- Integrated diode and resistor.

APPLICATIONS

- Industrial switching applications such as:
 - Print hammer
 - Solenoid
 - Relay and lamp driving.

DESCRIPTION

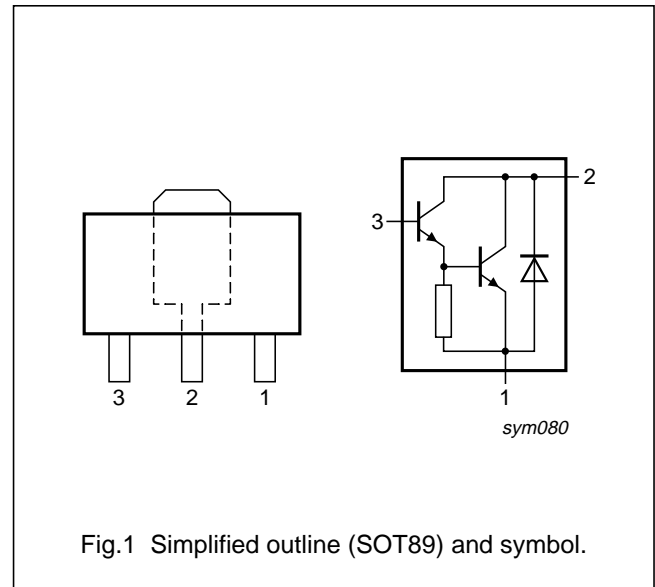
NPN Darlington transistor in a SOT89 plastic package.
PNP complements: BST60, BST61 and BST62.

MARKING

| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| BST50 | AS1 |
| BST51 | AS2 |
| BST52 | AS3 |

PINNING

| PIN | DESCRIPTION |
|-----|-------------|
| 1 | emitter |
| 2 | collector |
| 3 | base |



ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|-------------|---------|--|---------|
| | NAME | DESCRIPTION | VERSION |
| BST50 | SC-62 | plastic surface mounted package; collector pad for good heat transfer; 3 leads | SOT89 |
| BST51 | | | |
| BST52 | | | |

NPN Darlington transistors

BST50; BST51; BST52

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------------|---------------------------|----------------------------------|------|------|------|
| V _{CBO} | collector-base voltage | open emitter | | | |
| | BST50 | | – | 60 | V |
| | BST51 | | – | 80 | V |
| | BST52 | | – | 90 | V |
| V _{CES} | collector-emitter voltage | V _{BE} = 0 V | | | |
| | BST50 | | – | 45 | V |
| | BST51 | | – | 60 | V |
| | BST52 | | – | 80 | V |
| V _{EBO} | emitter-base voltage | open collector | – | 5 | V |
| I _C | collector current (DC) | | – | 1 | A |
| I _{CM} | peak collector current | | – | 2 | A |
| I _B | base current (DC) | | – | 100 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C; note 1 | – | 1.3 | W |
| T _j | junction temperature | | – | 150 | °C |
| T _{amb} | ambient temperature | | –65 | +150 | °C |
| T _{stg} | storage temperature | | –65 | +150 | °C |

Note

- Device mounted on a printed-circuit board, single-sided copper, tin-plated, mounting pad for collector 6 cm².
For other mounting conditions, see “*Thermal considerations for SOT89 in the General Part of associated Handbook*”.

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|----------------------|---|------------|-------|------|
| R _{th(j-a)} | thermal resistance from junction to ambient | note 1 | 96 | K/W |
| R _{th(j-s)} | thermal resistance from junction to soldering point | | 16 | K/W |

Note

- Device mounted on a printed-circuit board, single-sided copper, tin-plated, mounting pad for collector 6 cm².
For other mounting conditions, see “*Thermal considerations for SOT89 in the General Part of associated Handbook*”.

NPN Darlington transistors

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CHARACTERISTICS

$T_{amb} = 25\text{ °C}$ unless otherwise specified.

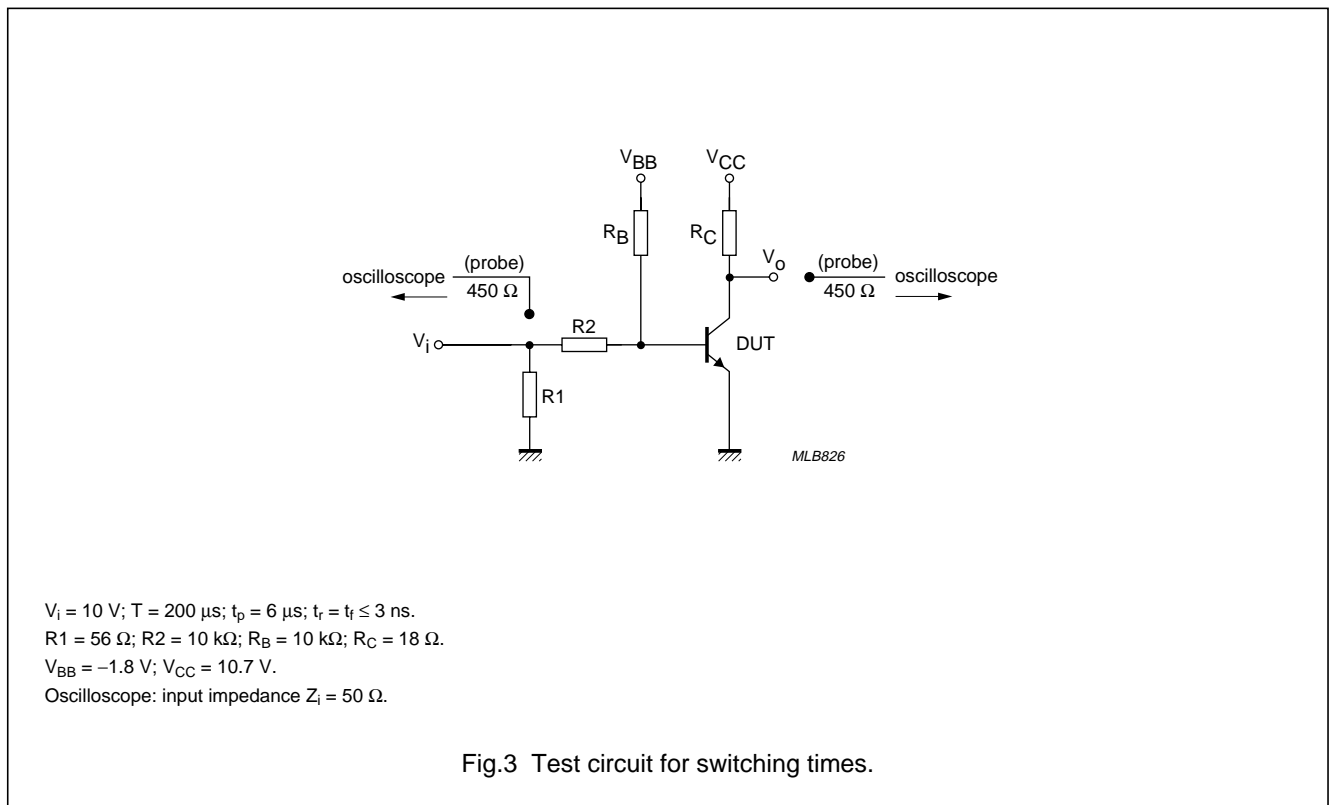
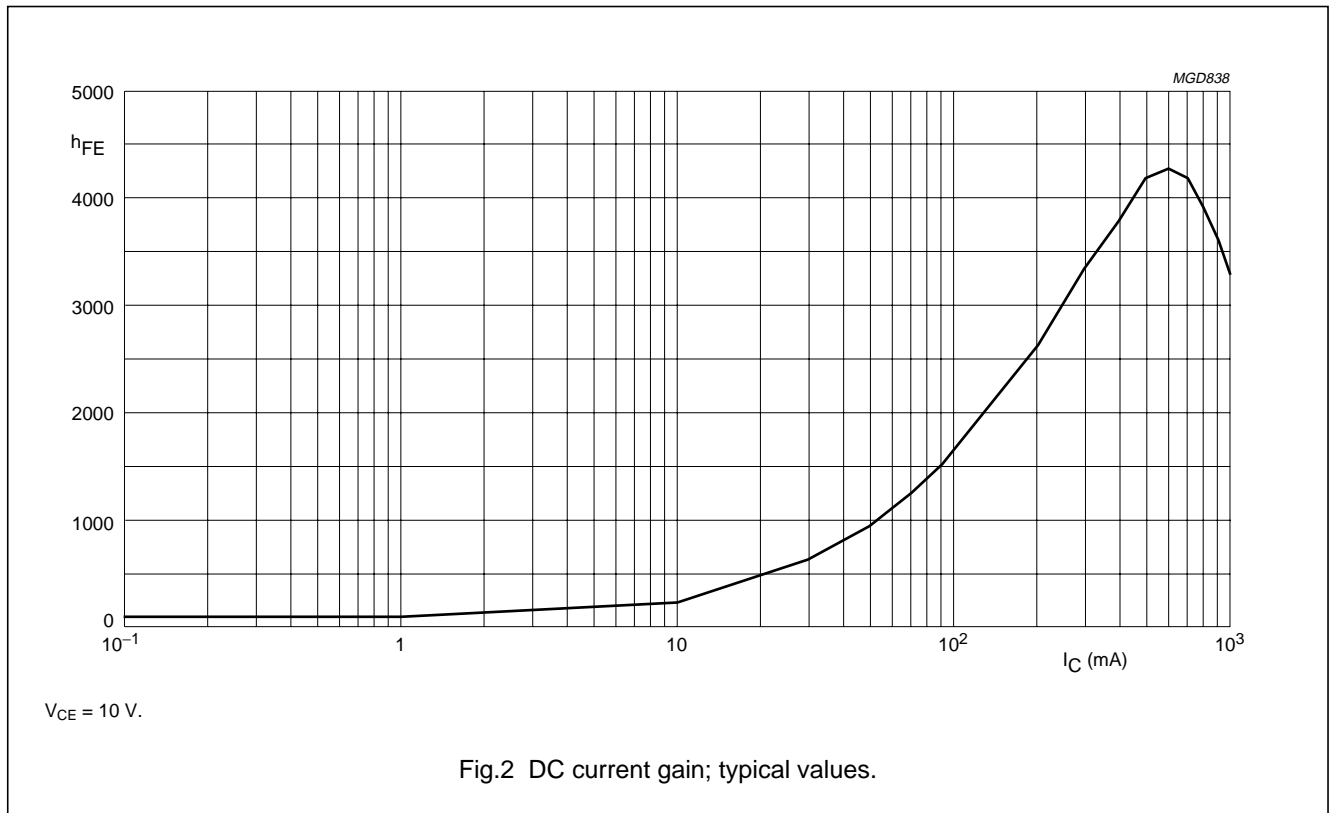
| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--|--------------------------------------|---|------|------|------|------|
| I_{CES} | collector-emitter cut-off current | | | | | |
| | BST50 | $V_{BE} = 0\text{ V}; V_{CE} = 45\text{ V}$ | – | – | 50 | nA |
| | BST51 | $V_{BE} = 0\text{ V}; V_{CE} = 60\text{ V}$ | – | – | 50 | nA |
| | BST52 | $V_{BE} = 0\text{ V}; V_{CE} = 80\text{ V}$ | – | – | 50 | nA |
| I_{EBO} | emitter-base cut-off current | $I_C = 0\text{ A}; V_{EB} = 4\text{ V}$ | – | – | 50 | nA |
| h_{FE} | DC current gain | $V_{CE} = 10\text{ V}$; note 1; (see Fig.2) | | | | |
| | | $I_C = 150\text{ mA}$ | 1000 | – | – | |
| | | $I_C = 500\text{ mA}$ | 2000 | – | – | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = 500\text{ mA}; I_B = 0.5\text{ mA}$ | – | – | 1.3 | V |
| | | $I_C = 500\text{ mA}; I_B = 0.5\text{ mA}; T_j = 150\text{ °C}$ | – | – | 1.3 | V |
| V_{BEsat} | base-emitter saturation voltage | $I_C = 500\text{ mA}; I_B = 0.5\text{ mA}$ | – | – | 1.9 | V |
| f_T | transition frequency | $I_C = 500\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$ | – | 200 | – | MHz |
| Switching times (between 10% and 90% levels); (see Fig.3) | | | | | | |
| t_{on} | turn-on time | $I_{Con} = 500\text{ mA}; I_{Bon} = 0.5\text{ mA}; I_{Boff} = -0.5\text{ mA}$ | – | 400 | – | ns |
| t_{off} | turn-off time | | – | 1500 | – | ns |

Note

1. Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.

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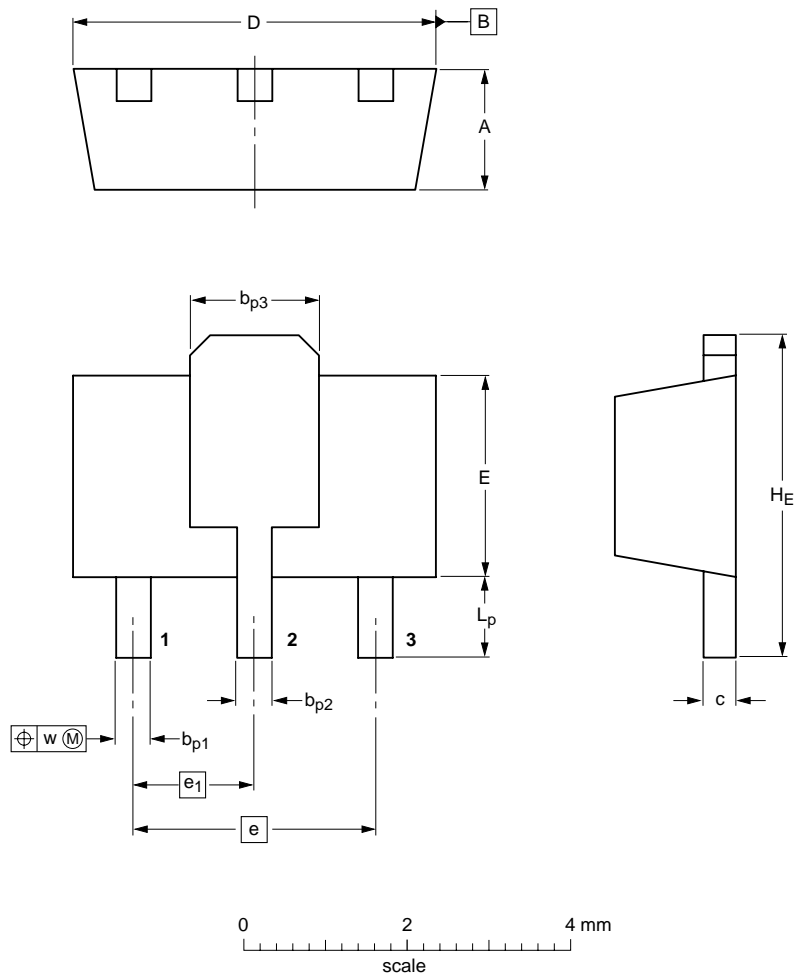
NPN Darlington transistors

BST50; BST51; BST52

PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 3 leads

SOT89



DIMENSIONS (mm are the original dimensions)

| UNIT | A | b _{p1} | b _{p2} | b _{p3} | c | D | E | e | e ₁ | H _E | L _p | w |
|------|------------|-----------------|-----------------|-----------------|--------------|------------|------------|-----|----------------|----------------|----------------|------|
| mm | 1.6 1.4 | 0.48 0.35 | 0.53 0.40 | 1.8 1.4 | 0.44 0.23 | 4.6 4.4 | 2.6 2.4 | 3.0 | 1.5 | 4.25 3.75 | 1.2 0.8 | 0.13 |

| OUTLINE VERSION | REFERENCES | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|--------|-------|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | |
| SOT89 | | TO-243 | SC-62 | | 99-09-13 04-08-03 |

NPN Darlington transistors

BST50; BST51; BST52

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|-------|----------------------------------|----------------------------------|--|
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